E5.3 Circles, arcs and sectors

Name: _____ Class: _____ Date: _____ **Total: 12 marks**

KEY WORDS circle • radius • circumference • sector area • arc length

Objective

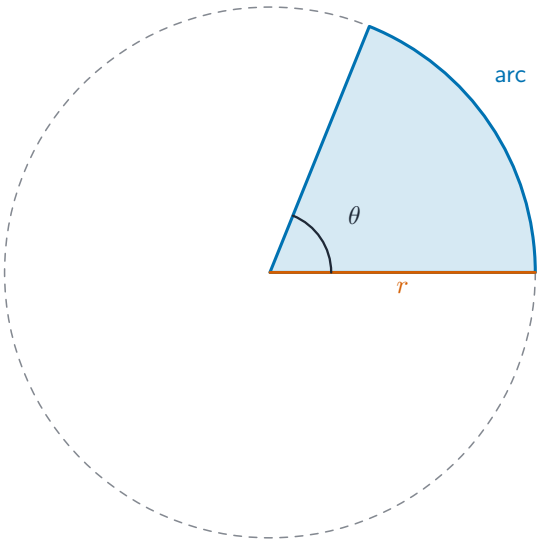
Build the skills to answer Extended exam questions on **circles, arcs and sectors** , – **circumference and area** , and the **arc length** and **sector area** .

You must be able to:

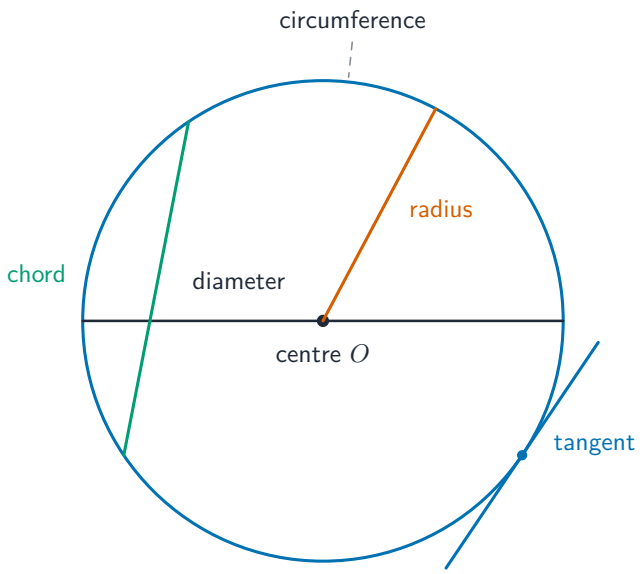
- find the circumference and area of a circle
- find an arc length and a sector area
- find the perimeter of a sector

1 Key knowledge and worked examples

Arcs and sectors



Take the fraction $\frac{\theta}{360}$ *of the whole circle*



The named parts of a circle used in arc and sector work

$$\text{circumference} = 2\pi r \qquad \text{area} = \pi r^2$$

$$\text{arc} = \frac{\theta}{360} \times 2\pi r \qquad \text{sector area} = \frac{\theta}{360} \times \pi r^2$$

- **Worked ($\theta = 90°$, $r = 8$):** fraction $\frac{1}{4} \to$ arc $= \frac{1}{4} \times 16\pi = 4\pi$ cm; sector area $= \frac{1}{4} \times 64\pi = 16\pi$ cm^2.

Answer shapes: M1 a correct method, **A1** the correct answer.

2 Practice

2.1 Find the circumference of a circle of radius 5 cm, in terms of π. [1]

2.2 Find the area of a circle of radius 6 cm, in terms of π. [2]

2.3 Find the arc length of a sector with angle 90° and radius 12 cm, in terms of π. [2]

3 Exam-style questions

3.1 A sector has angle $120°$ and radius 9 cm.

(a) Find its area, in terms of π. [2]

(b) Find its perimeter, in terms of π. [3]

3.2 A circle has area 36π cm^2. Find its radius. [2]